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Hygienic Conditions in Iowa Schools

BY

IRVING KING

PUBLISHED BY THE UNIVERSITY, IOWA CITY, IOWA

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University Extension Bulletin No. 11

O. E. KLINGAMAN, M. A., Editor

Hygienic Conditions in Iowa Schools

A report on conditions in schools of 181 cities
and towns in Iowa

BY

IRVING KING, PH. D.

PUBLISHED BY THE UNIVERSITY
IOWA CITY, IOWA

The writer's class in "School Hygiene" (1914-1915) rendered much assistance in the preliminary tabulations for this Report; and in the further detailed work necessary for the completion of the study special acknowledgement should be made of the patient and careful help of Miss Florence Schneider, a graduate student in the University of Iowa.

Hygienic Conditions in Iowa Schools

The conditions described in this report must be considered as true only for the time between April 1st, 1914, and January 1st, 1915. In many localities new buildings have already taken the place of the ones here reported upon. (Des Moines reported in April 1915.)

The 181 cities and towns from which reports were sent are distributed according to size as follows:

155 to 500 population	45
501 to 1000	55
1001 to 3000	36
3001 to 6000	11
6001 to 10000	3
10001 to 15000	4
86,368	1
Consolidated Schools, mostly in small villages and and the country	26

181

Number of separate school buildings reported upon 347
(Des Moines 42)

THE SCOPE OF THE INQUIRY.

The questionnaire on which answers from the above schools were returned, made inquiry first as to the sanitation of school grounds and buildings, secondly as to the hygienic conditions of school rooms and class rooms, and, thirdly, as to special precautions for the protection of the children themselves. There were, in all, approximately 176 questions regarding hygienic conditions. These were, however, so stated as to be easily answered, in most cases by a mere check mark. Superintendents were urged to see that the blank was filled out while the school was in session and the children actually in their seats. Where measurements were required it was suggested that the pupils be instructed to

make them under the supervision of the teacher.

Notwithstanding the fact that the queries were supposedly quite clear, many ambiguities appeared in the answers, and very few of the questions were answered for each one of the 347 school buildings, so that in practically no case will the answers to any one question be found to tally with the number of schools reporting. In some cases the failure to answer seemed to be due to carelessness or to failure to make the effort necessary to find out the point in question. In some cases the failure to reply evidently meant the absence of any thing to report. Thus in answer to the question, Do you have dental inspection? several said "No", most left the question unanswered. It is fair to conclude that all schools which do have dental inspection reported it, so all which were blank may fairly be included with those answering definitely, "No."

A considerable number of superintendents who requested copies of the questionnaire with the ostensible purpose of filling it out and returning it failed to do so. Thus the report given herewith is not nearly as complete as it was hoped it might be. Not very many of the larger cities were included in the inquiry. It was desired to make the study chiefly one of villages and towns of 400 to 6000 population, and 72 per cent of the towns here reported fall within these limits. This represents 30 per cent of the cities and towns of the state of this size.

The conditions here reported are probably quite fairly representative of the conditions which generally prevail in the city and town schools of Iowa. The incompleteness of the report is to be regretted chiefly as it concerns the precautions taken by schools for safeguarding the health of children through medical inspection and examinations of eyes, teeth, etc. Here exact and complete information as to what is now being done along these lines is greatly to be desired. It is quite likely that much of the best of such work is done by larger cities not included in this study.

THE SIZE OF SCHOOL GROUNDS

The first thing that impresses the observer of schools in small as well as in large towns and cities is the frequent failure, in laying out the city and locating the school grounds, to provide grounds of sufficient size for real play-grounds. The need of ample grounds is not yet actually recognized in many towns.

In many cities, however, as the vacant spaces have been built up the need of play spaces has become more apparent.

Table I presents the sizes of the school grounds as far as they were reported, reduced to a common basis of square rods. In some cases especially where "a city block" was given as the size of the school yard an estimate had to be made. From 326-350 square rods considered as probably a fair approximation in all such cases.

This table shows that the median school ground contains between 201 and 225 square rods. 50 schools have grounds of about an acre in area and 69 schools have grounds of less than an acre.

TABLE I

The size of school grounds of 325 town and city grounds of Iowa, 22 schools did not report the dimensions of their grounds.

<i>Square rods</i>	<i>Frequency All cities and towns</i>
2.17	1
18.3	1
25-50	4
51-75	12
76-100	27
101-125	19
126-150	24
151-175—One acre	50
176-200	7
201-225 Median	20
226-250	4
251-275	11
276-300	11
301-325	10
326-350—Two acres	65 (a city block)
351-375	4
376-400	9
401-425	4
426-450	1
451-475	3
476-500—Three acres	4
501-525	4

<i>Square rods</i>	<i>Frequency All cities and towns</i>
526-550	3
551-575	3
576-600	3
601-625	
626-650	5
651-675—Four acres	2
676-700	1
701-800	3
801-900—Five acres	2
901-1000	3
1001-2000	3
4884—Thirty acres	1
6400—Forty acres	1

21 % of the school grounds are less than one acre in size

THE CHARACTER OF THE SCHOOL GROUNDS

Healthful Location

In locating a new school building it too often happens that the character of the grounds receives only minor consideration. Suitable grounds are, however, of vital importance, not merely that the children may have a good place to play, but also that the building itself may be hygienic. Surely healthful grounds cannot be left out of account in determining a location where little children are to spend a large portion of their waking hours at seasons of the year when rain or snow is a frequent occurrence or even a possibility. Disregard of the kind of grounds used can be attributed only to ignorance of the extent to which health is dependent upon them.

Low and poorly drained grounds almost inevitably make damp basements and damp buildings. Such grounds, also, when the frost is out of them are apt to be unsuitable for play during protracted periods, especially in the spring months. Moderately high school grounds usually have adequate natural drainage.

Flat grounds may be rendered suitable by artificial drainage. Low grounds are always to be condemned.

The conditions reported for these Iowa schools appear to be fairly satisfactory. The grounds of 196 schools are said to be high; 121 are flat, 22 are low. Good drainage is reported for 292 schools; fairly good for 8, and 36 are given as wet.

11% of the school grounds are reported as wet

Distance from Other Buildings

The distance of other buildings from the school building is important from several points of view. Adjoining buildings less than 50 feet distant may, if high, interfere seriously with the lighting of the school-rooms, especially those on the ground floor. Such buildings may also impair the usefulness of the play-grounds. Furthermore they may be used for purposes that interfere with the school's work or they may be postively detrimental to the health and morals of the children. This is especially true of factories by reason of their many employees, or because of noise, smoke and bad odors. Buildings of this sort are of course undesirable even when several times 50 feet distant. Free space of a width of 75 to 100 feet is a very modest requirement for a school building of any size and it should often be much more than this.

The conditions reported in reply to the query as to the distance of the nearest building are as follows:

TABLE II

Nearest buildings within 10-20 ft.	21 schools
Nearest buildings within 20-30 ft.	24 schools
Nearest buildings within 30-40 ft.	20 schools
Nearest buildings within 40-50 ft.	28 schools
Nearest buildings within 50-75 ft.	68 schools
Nearest buildings over 75 feet	183 schools

Of these, 321 report that such adjoining buildings are not unfavorable to the pupils' health or efficiency; 14 schools report that the adjoining buildings are detrimental to the school. The


lack of definite and uniformly applied standards in answering this query impairs the value of the information given, but it is at least roughly significant.

Suitable Playgrounds

The need of suitable play grounds for the schools is now generally recognized. Many schools in small towns as well as in the cities are quite inadequately provided in this respect from the point of view of mere size alone. From the first table one can see how many diminutive school yards there are. Although the median school ground area is nearly 225 square rods, there are 64 school grounds only one half this size, and the median ground of the Des Moines schools where play space is needed if anywhere is scarcely more than 135 square rods, nearly 100 square rods less than the median of the state.

The query as to whether the grounds were suitable for playgrounds brought the answer "yes" from 275 schools, and "no" from 34 schools, while 15 reported "fairly so".

Here, again, the lack of a suitable standard as to what constitutes a good play-ground renders these numbers only rough measures of actual conditions. It is probable that only the very small or otherwise very unsuitable play-grounds were reported as such.



15% of the school grounds are reported as unsuitable for play grounds

Playground Surface

The surface of the play-grounds is also important. A tough close sod cannot be surpassed, especially for the elementary grades. But it is impossible to keep sod on a moderately sized play-ground which is actually used by many children. A smooth dirt surface would be good were it not for the dust or the mud which is sure to be present at times. The muddy grounds are a menace to health through the resulting dirty floors and wet feet.

Grass is reported either as wholly or mainly the school-yard covering of 205 schools. Clay or dirt of 94. Cinders 31. Gravel

15. There was some overlapping in these answers.

From the point of view of the cleanliness of the school building and of the children the surfacing of adjoining streets is always important. 61 schools report paved streets; 13 macadamized; and 274 dirt.

The Traffic

The traffic on adjoining streets often interferes with the efficiency of the school because of the distraction due to noise and to the frequent passing of vehicles. Moreover, heavy traffic passing by a crowded school yard is a menace to the lives of the children at play. Only 33 of these schools report heavy traffic; 127 report medium, and 170 light.




- (A) Heavy Traffic, 10 %
- (B) Medium traffic, 40 %
- (C) Light traffic, 50 %

THE CHARACTER OF THE SCHOOL BUILDINGS

This is an era of building in the school world. Modern buildings are rapidly displacing old and unsanitary structures. Several consolidated schools in Iowa, located in country communities have the finest type of modern fire-proof building. While the progress is commendable, it will take a long time to get rid of all the school buildings that should go.

Buildings Old or New

Of the schools reporting for this investigation 111, or nearly 33 1-3 per cent have new buildings; 64 are modern, and 145 are old. Six are partly new and partly old. 242 buildings are said to be in good repair, and 45 are reported as shabby. In several cases it was stated that the old shabby structure was soon to be replaced by a new building. Some superintendents would not report on their schools at all because a report of current conditions would be unfair to the community which had already voted a new building or was actually erecting one.

- 
- (A) 33 1-3 % of the buildings are reported "new"
 - (B) 45 % of the buildings are reported "old"
 - (C) 21 % of the buildings are reported as "modern"

Out-Swinging Doors

The precaution of having the outer doors open outward seems to be almost uniformly observed, 334 buildings reporting this condition. Of the 11 which report inward swinging doors, almost all are small one-room buildings.

Fire Escapes

As to fire escapes, the State Laws are explicit in requiring that all school buildings covering a ground area of 2500 square feet and three or more stories in height shall be so provided. 155 of these buildings report having fire escapes; and 53 report none. It was not possible to determine whether these schools are violating the law or whether they are of a size that does not require this precaution. In Des Moines, for instance, 27 buildings report that fire escapes are not needed.

Fire Drills

The state laws also require monthly fire drills in all school buildings. The question asked was, "Do you have monthly fire drills as required by state law?" The response was 283 in the affirmative, and 31 in the negative, 8 schools report "not regularly", and two as "not needed".

Halls

It sometimes happens, in planning a new building, in the desire to have ideal class-rooms or school rooms, that most attention is centered on them, and the halls receive insufficient consideration.

At least three things should be kept in mind in planning halls: Their width, lighting and cleanliness.

Width of Halls

As to width there are well recognized standards.* The width must be such as to prevent congestion of pupils on even unusual occasions. The width should be increased with the age of the pupils to be accommodated. In high schools 16 feet is a good width. They should never be less than 14 feet. For grammar schools 12 feet is a moderate estimate. Certainly the elementary grades should fall very little short of this. The width depends to some extent on the length. A very short hall, into which many different rooms open, must be proportionally broader. It was desired in this study of Iowa schools to obtain a classification of all halls as to width. Aside from a few failures to answer, the answers were ambiguous in that some checked the width for the entire building without specifying the number of the halls; others gave the actual number of halls of varying widths.

Table III.

Width of halls in Iowa School Buildings	
Less than 10 ft.	135
10 ft.-12 ft.	132
12 ft.-16 ft.	101
Over 16 ft.	59

In 60% of the schools the halls are too narrow

Lighting of Halls

The lighting of halls is also important, not merely from the point of view of the proper supervision of the children, but also from decorative considerations. Pictures cannot be placed with any satisfaction in a narrow, ill-lighted hall. Dresslar says: "I believe one of the weakest points about our types of school buildings is that the halls are not generally attractive and are rarely well-lighted."

On the question of lighting, 270 Iowa school principals report

*Dresslar, "American School Houses," *Bulletin Bureau of Education*, 1910, No. 3.

the halls *well-lighted*; 10 *fairly well-lighted*; and 49 as *dark*.



18% of the schools report that their halls are not properly lighted

Cleanliness of Halls

The third consideration for halls is that they be so constructed as to be easily kept clean. The floors are subject to more wear than the rooms and they should receive special attention. Concrete or tile floors for halls are especially recommended. A certain type of asphalt floor has also been found very satisfactory, both easy to clean and noiseless. Good oak floors stand next in desirability. Clean halls present a real problem which is probably not adequately recognized in the answers to the question on cleanliness. 259 schools report clean halls. 5 report fairly clean, and 11 report their halls as dirty.

The Stairways

There are for stairways, as for halls, well-recognized standards. Our inquiry covered only width and material. As to width 5 1-2 to 6 feet should be the minimum to insure safety from congestion.

In reply to our inquiry 168 stairways of less than 5 feet in width were reported; 166 of 5 feet; 79 of 6 feet width; 83 of 7 feet, and 10 of a width of 8-10 feet.

As to whether the balustrades should be opened or boxed in there is difference of opinion. In mixed schools it is probably best that the lower part of the balustrades should be closed. In the schools here considered the closed balustrade seems to be the favorite type, 178 reporting closed, and 125 open.

Fireproof Stairways

The stairways in even a wooden building should be of fireproof construction. In fact, the need of fire resisting stairs is greater, if anything, in a wooden than in a stone or brick structure. The answers gained on this point in our inquiry were not complete. Wood stairways were reported for 49 buildings; fireproof stairs in 54 buildings, and 202 schools did

not report. It is probable that all the buildings with fire-resisting stairways reported. Hence, the prevailing condition in this respect in Iowa is far from ideal.

86 % of the stairways are wooden

Outside Toilets

Outhouses still persist in a large number of our town and village schools. These are often vile both materially and morally. 130 of our schools reported outside toilets. The following table shows that many of them are located quite near the school buildings. The median distance is between 50 and 75 feet. 24 schools did not report the distance. Certainly 100 to 150 feet would be better.

Table IV

Distance of outside toilets from school buildings.

Less than 25 feet	4
25-50 ft.	29
50-75 ft.	32
75-100 ft.	29
100-150 ft.	6
175 ft.	1
200-300 ft.	5

Median 50-75 feet.

61 % of the outside toilets are less than 75 feet from the school building

Separation of Toilets

Strangely enough the proper separation and screening of toilets is often neglected, especially in country districts. Studies in rural school conditions in a number of states have revealed a most amazing disregard of the most elementary principles

of decency. In Pennsylvania, for instance, 112 rural schools recently reported that both sexes used the same outhouse. Similar conditions, as a result of actual investigations, are found in parts of Iowa. In the villages and towns the chief criticisms are probably with reference to proper separation, screening and cleanliness. * In our study there were 119 reporting that boys' and girls' outside toilets were properly separated; 11 that were not; 96 reported suitably screened; 15 not and 3 fairly so; 105 reported privy vaults and 19 none.

Inside Toilets

Inside toilets were reported by 205 of the schools. The problems of separation, of cleanliness and light were the only ones on which inquiry was made. One school was visited in which the two toilets opened into the same hall along which the boys and girls both passed and the door of one was standing open. Fourteen schools reported that the inside toilets were not completely separated.

Cleanliness and light are absolutely essential. If possible the rooms should be flushed with sunlight for a portion of the day. To facilitate lighting and encourage cleanliness the walls should either be of white glazed tile or white enameled. That this is feasible is proved by the experience of principals who have tried it. However, there are too many principals who favor dark painted walls so the "defacements will not show."

191 schools report well-lighted toilets; 14 report they are dark. Clean fixtures are reported by 199; clean air by 173; fairly 3 and foul by 7. 178 schools report water flushing; and 24 dry types.

No inquiry was made as to the degree of privacy furnished by accommodations within the toilet, but an inspection of many

*SECTION 2784: WATER CLOSETS. It shall give special attention to the matter of convenient water-closets or privies, and provide on every school-house site, not within an independent city or town district, two separate buildings located at the farthest point from the main entrance to the school house and as far from each other as may be, and keep them in wholesome condition and good repair. In independent city or town districts, where it is inconvenient or undesirable to erect two separate outhouses, several closets may be included under one roof, and if outside the school-house each shall be separated from the other by a brick wall, double partition, or other solid or continuous barrier, extending from the roof to the bottom of the vault below, and the approaches to the outside doors for the two sexes shall be separated by a substantial close fence not less than seven feet high and thirty feet in length. (25 G. A., Ch. 3.) Code of Iowa, 1897.

school toilets shows clearly that much is to be desired in these directions. Whatever sense of modesty the child has is not encouraged, but rather broken down. In some schools the vicious practice prevails of "keeping children in" for several minutes after school as a penalty for visiting the toilet during the school session. Sometimes the janitor locks the toilet room doors as school is dismissed although many children may still be detained about the building.

The provision of a suitable lavatory and towels is a self-evident hygienic requirement for every school toilet, but it is often omitted. The schools reporting here make fairly good showing, 163 saying that lavatory and towels are provided and 21 that they were not. Others did not report on this point.*

As to the kind of towels, 121 paper; 46 linen or other fabric; none or blank 27. The use of the paper towel, even to this extent, is encouraging.

197 schools report the toilet room doors kept shut, 15 report that they are not. It is explained by some who answer "No" that it is not necessary on account of their location in completely separate parts of the basement.

The Water Supply

With reference to water supply, 137 schools depend on wells. School wells deserve more consideration than they usually get. They are often shallow and the water contaminated. Of those reporting wells, 50 are dug, 43 driven or drilled. 84 report that the wells are tightly covered.



40 % of the schools depend on wells for drinking water

Among the different precautions against contamination of well water is isolation from the drainage of outside toilets and other surface pollution. Our inquiry touched only the distance from the toilets and these are given in the following table. Only 68 schools give this distance. The median is seen to lie between

*This query referred specifically to lavatories in toilets. cf. with paragraph below on "Lavatories".

75 and 100 feet, which instead of being the *median* distance should be the *minimum* distance.

Table V
Distances of Wells from Toilets*

30-50 feet	14
50-75 feet	14
75-100 feet	11
100-200 feet	21
Over 200 feet	11

A public water supply is reported by 176 schools. In answer to the query as to whether the purity of the water used by the school had ever been tested, 125 replied that it had and 85 reported definitely that it had not. Surely there is here a serious remissness in observing a most necessary precaution.

There are many hygienic problems connected with the proper handling of drinking water in schools. The use of buckets or tanks is common. These are sometimes left uncovered and are seldom scalded out every day as they should be. Then there is the question of cups. 142 schools report the use of buckets or tanks; 28 schools still use common drinking cups; 97 mention individual cups; and 225 drinking fountains.†

In 8% of the schools the common drinking cup is still used

Lavatories

School health would undoubtedly be greatly promoted if opportunities for frequent washing of faces and hands were adequately and attractively provided. The hands especially are

*Revised Rules State Board of Health, 1911, Chapter 4, Rule 6, Section 1:

No privy vault shall be within one hundred feet of the nearest well or other source of water supply for drinking or culinary purposes: it shall not be in water-bearing strata.

†It is worth noting that not all so-called drinking fountains are really sanitary. Some do not bubble high enough to permit of drinking without putting the lips in actual contact with the orifice or cup surrounding the orifice. They thus are little if any better than the common cup which they have displaced. Every teacher should insist that the drinking fountains actually bubble up and should determine by frequent observation whether the children tend to put their mouths on any of the parts of the device.

soon soiled in the ordinary school. Desks, doors, and other wood work become grimy and the opportunities for infection are multiplied. Why should not all the tops of desks and all parts of wood work frequently touched by the children be washed every day with soap and water? If this is idealistic with our present type of janitor service and lax public sentiment, the washing of hands with soap and water and wiping on a clean paper towel is surely immediately practical. 244 schools report facilities for washing hands and faces. 21 schools state they do not have such facilities. Basins are used by 102 schools, and running water is reported by 168; 203 report towels. It is impossible to be sure whether those not reporting on this point are unprovided with towels, but it is fair to assume that many of them are not. 150 schools report paper towels, 81 cloth, 7 individual and two report the children use their handkerchiefs. It is to be feared many more do the same, although a clean handkerchief is certainly to be preferred to a soiled cloth towel. In one school the children are said to furnish their own towels.



40% of the schools report the use of paper towels


The Heating System

The heating of school rooms presents many well known problems. Stoves alone are used by 25 of our schools, hot air by 74, hot air and steam by 6, steam alone by 202, hot water 20, hot water and hot air by 1. Of all these the stove is the least desirable, unless jacketed and provided with an outside intake for fresh air. Choice among the other methods depends on circumstances. Steam heating seems to be in most favor at present.



7.5% of the schools use stoves for heating


Of more importance than the method of heating is the question of getting the heat evenly distributed and the question of preventing children from becoming overheated by sitting too close to the source, such as register, radiator or stove. The latter problem apparently presents difficulties which many schools have not been able to overcome, 125 reporting that some of their children are obliged to sit too close to radiators, etc., 172 that they are not. According to 243 principals the heat is well distributed over the rooms. The answers to this question cannot be expected to reveal any but the most obvious defects of this sort. Teachers have no means of determining accurately the distribution of heat over a school room.



In 42% of the schools children have to sit too near stoves, radiators, etc.

Thermometers

A thermometer in every school room is absolutely essential to the proper regulation of the temperature. 303 schools report thermometers in every room, and 21 report that there are not. 23 schools do not report.



6% of the schools do not use thermometers

The placing of a thermometer is important. Against the outer wall it is apt to register too low, against an inner wall too high. It is better to have it suspended near the middle of the room. In the case of 43 schools the thermometer is placed against the outer wall of the rooms, against the inner wall of 237 schools, and suspended in the center of the room in 62 instances.

The thermometer should not be hung so high that it registers the temperature of the stratum of air quite above the heads of

the children. In general the tendency is to hang a thermometer too high rather than too low. Table VI states the practice of the 276 schools which answered the query.

Table VI

Distances of thermometers from floors

2-3 feet	13
4-4½ feet	62
5-5½ feet	144
6 feet	46
7 feet	9
8 feet	2

70 % of the schools hang thermometers too high

A thermometer must not merely be in the school room but it must be consulted and the temperature of the room regulated accordingly. Too many thermometers are mere ornaments. In 236 schools the teachers are said to try to regulate the temperature by the thermometer. In 25 schools there is no attempt. 8 schools report thermostats.

Considerable variations appear in temperatures at which rooms are kept, although both the median and the modal temperature is given as 70°. It is now generally recognized that, with a humidity of 60 to 65%, a temperature of 68°F. is most desirable for school rooms. The relative humidity and perceptible motion of the air are of more importance than the proportions of oxygen and of carbon-dioxide. Hence it appears that every school room should be provided with a simple hair hygrometer. Such an instrument with a face like an alarm clock, from which the relative humidity of the air can be read as readily as the time from a clock, costs less than \$2.50, and should be in every school room. Some of the school rooms of one city here reported were tested and found to have air of a relative humidity of 20 per cent. Such air is drier than desert atmosphere and is sure to produce harsh, dry skin and parched mucus membranes of throat and nasal passages with attendant liability to colds, and other affectations of the respiratory passages.

Table VII

Temperatures at which rooms are kept

60-70°	2
65°	6
68°	34
68-70°	52
68-74°	6
70°	142
70-72°	7
72°	7
70-75°	2
75°	4

The median is about 70°.

One school reports an automatic system under which the temperature varies from 48° to 80°.

64% report a room temperature of 70° or above; too warm if humidity is right

Most school rooms are not provided with any means of introducing more moisture into the air, except the opening of the windows which is fairly effective except in very cold weather. Notwithstanding that 95 of these schools report provision for keeping the air properly moist the answer is of doubtful merit, for many of those answering do not really know what proper provision really is. For example several report *steam heat* as the method of keeping moisture in the air. It is needless to say that this is *not* an adequate method. Pans of water set on stoves, or radiators, jets of water sprayed into hot air chambers, where hot air systems are in use, are fairly effective but not completely so.

Ventilation Systems

Window ventilation is reported by 156 of our schools. All ventilation systems need to be supplemented by windows. By proper adjustment of windows a movement of the air

through the school room may be secured. The children can be protected from strong drafts by the use of window boards about 5 inches in width placed under the lower sash; this permits the air to enter the room between the lower and upper sashes. Of our schools, 99 report the use of such boards, and 75 that they do not. 146 schools report the use of some venti-

34 % of the schools do not use window boards

lating system other than or in addition to windows. But no ventilation system is perfect and fresh, cold outdoor air needs to be frequently admitted into all school rooms. 224 schools report periodic flushing out of rooms by opening of windows. 39 schools do not. Table VIII gives the frequency of this as reported by these schools.

Table VIII

Rooms flushed by opening windows

Hourly . . . . .	.11
At recesses or 2-4 times a day	128
3-5 times a day	18
6 times a day	4
Windows always open	3
Not regularly	9
Any time	1
Spring and Fall	1

36 % of the schools do not flush out rooms periodically by opening windows

Cloak Rooms

The older school houses frequently failed to make any provision for the disposition of wraps and lunches other than hooks in the main halls or in the rear of the school rooms. This

is now recognized as unhygienic. Hanging them in the all-too-narrow halls is also unsightly, and gives too ready opportunity for pilfering. If lockers are impracticable as they would be in most elementary schools, an adequate cloak room should be provided in connection with every school room, to be entered only from the room itself.* It is needless to say these cloak rooms should be well ventilated and heated that damp wraps may dry and odors be carried off.

Of these schools, 214 report cloak rooms, 77 report none, and 56 do not report. The answers on the query as to ventilation are not all clear; only 56 report that their cloak rooms are not well ventilated. In 76 schools the wraps and lunches are said to be hung in the main halls; in 4, in the school rooms; 3 schools report cupboards and shelves for the lunches; 2 a back room for this purpose; 4 lockers; one school reports wraps and lunches are put anywhere; one in the basement and one in the principal's office.

The School Rooms

There is no particular standard as to the number of school rooms that a building should contain. This is governed entirely by the type of building. There are undoubtedly instances of too many rooms for the size and arrangement of the building. Table IX is given here merely to show the varying sizes of the buildings reported.

Table IX

Number of School Rooms in Buildings

(Rooms used for study and recitation)

Number rooms	1	2	3	4	5	6	7	8	9	10	11	12	12+
Frequency	16	26	10	66	39	55	19	57	21	20	8	9	13

Number of Class Rooms in Building

(Rooms used for recitation only)

Number	1	2	3	4	5	6	7	8	9	10+
Frequency	54	46	23	26	16	7	6	4	4	14

Size of School Rooms

The theoretical standard of 20 square feet of floor space for every pupil in the room is seldom followed in practice.

The ideal school room should certainly not exceed 25 x 30 feet in floor dimension. This provides 20 square feet of floor space

*Dresslar "American School Houses," p. 51.

for about 35 pupils. A wider room is apt to be improperly lighted on the side away from the windows, and a longer room requires too much strain on the teacher both in the matter of voice and of control of the pupils. Moreover, a longer room renders it difficult to see work on the blackboards which should of course be in front of the pupils.

The dimensions of rooms given in these reports are as follows:

Table X

Less than 20 x 32 feet	.	.	.	.	419
Approximately 20 x 32 feet	.	.	.	.	709
In excess of 20 x 32 feet	.	.	.	.	1111



50 % of the rooms reported are larger than standard size

Number of Children to the Room

As to the number of children in a room 35 to 40 should be the maximum; better 25 to 30.

These schools report

Table XI

Number of rooms with 20-30 children	.	.	.	691
Number of rooms with 30-40 children	.	.	.	734
Number of rooms with 40-50 children	.	.	.	378
Number of rooms with 50-60 children	.	.	.	57
Number of rooms with more than 60 children	.	.	.	61

The Seating

The old fashioned double seats are disappearing and properly so. However, 35 schools report still using double seats and 25 other schools use double seats only in part and 281 report single seats entirely.

A	
B	
C	

(A) 14% use double seats (B) 10% use both single and double seats (C) 71% use single seats only

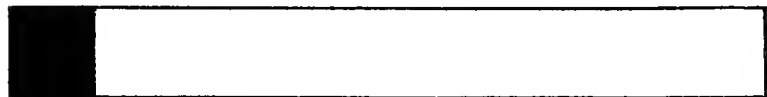
The need of adjustable seats has long been recognized but many difficulties have appeared to interfere with their general adoption. Not many adjustable types of seats are entirely free from objection of one sort or another. For example, some types have proved difficult to adjust properly; the expense attached to really desirable varieties has proved a serious obstacle to their general use. Many schools attempt to have a few extra seats of a different size on hands to meet the needs of very small or unusually large children. But this expedient is really quite inadequate. Even if the proper size is available it is not always easy to get it installed. Besides there are really two different adjustments that need to be made, viz: the height of the seat and the height of the desk and these two requirements are seldom properly met even with fixed seats of different sizes. 49 of our schools report the use of adjustable seats; 36 of partly adjustable and 257 seats of those reporting the use of fixed seats, 112 schools say there are desks of different sizes available to suit all children, while 46 schools say that no such adjustment is possible.



11% of schools report adjustable seats

The writer has never visited a school provided only with fixed seats in which there were not some children improperly seated either on seats too high or too low, or at desks too high or too low. However, with reference to too high seats, 79 schools report that none of their pupils are so seated, 3 schools report a few while one school reports 10 per cent of its pupils in seats too high and the rest of the schools reporting on this point give 1463 children in seats too high to put their feet squarely on the floor. 82 schools report no children sitting in seats that are too low, but the remaining schools give 1183 children so seated. With reference to too high desks the question was asked, "How many children when sitting upright are obliged to raise their forearms considerably when resting them on their desks?" 66 schools report "none", 5 schools reported some; one principal "didn't know" and the remaining schools

reported 1651 children seated before desks too high for them to work at properly. It is not strange that many children acquire lateral spinal curvature and humped shoulders at school when the seating is so obviously defective as these reports seem to indicate.



In 11% of the schools seats are not properly adjusted to the size of the pupils

Lighting of School Rooms

Sides on which light enters

Unilateral lighting while the accepted standard for all modern school room construction, may be carried to an extreme. High windows in the rear of a room or one or two windows at the pupils' right but well back are often essential to adequate lighting and the cross shadows from them are negligible. Unilateral lighting also in rooms depending on window ventilation shuts off the opportunity for perceptible air currents now regarded as so desirable. Lighting in front of the pupils should not, of course, be permitted although it still persists in many buildings; nor should rear lighting be strong enough to injure the teachers' eyes.

Our statistics show that 667 of the rooms reported on have unilateral lighting, 100 from the rear only; 433 are lighted from two sides; 1216 from one or both sides and rear; 40 are lighted from the front in addition to sides or rear; one room reports front light only and one sky-light.

Ratio of Glass Area to Floor Area

The glass area which should be counted in computing this is that which gives an unobstructed view of the sky. The accepted standard today is a lighting area equal to *at least* one-fifth of the floor area. Where state aid is given to schools in which one of the requirements is the modern building, this aid should be withheld where this standard of lighting is not reached.

The ratios of lighting area to floor space given in these reports

is as follows:

1 : 13	1 room	1 : 7	261 rooms
1 : 12	8 rooms	1 : 6	351 rooms
1 : 11	1 room	1 : 5	688 rooms
1 : 10	11 rooms	1 : 4	497 rooms
1 : 9	2 rooms	1 : 3	8 rooms
1 : 8	221 rooms	1 : 2	5 rooms

40 % of the schools reported have too low a ratio of window area to floor area

A room with insufficient lighting area may be well lighted on ordinary days in spring and autumn, but in the winter months and on cloudy days the light becomes entirely insufficient. The most surprising variations have been noted by careful measurements taken in various portions of apparently fairly well-lighted school rooms. Sixty-five of the schools included in this report say they have no insufficiently lighted rooms, while 512 rooms are reported by the remaining schools as having insufficient light on slightly dark days for books to be read easily or for writing on black boards to be read without strain on the eyes.

Shades

The difficulty of providing sufficient light for school rooms under the wide variations due to season and weather have led to the recognition of light shades as preferable to dark ones. The best color for school room window shades is light tan, such as will cut off blinding rays of the sun, but permit enough light to pass through to keep the room well illuminated. And yet dark shades, usually dark green, are most commonly used in schools. Worse still, these dark shades are often kept drawn halfway down even on cloudy days, because "they look better so." 204 of these schools report dark shades; 96 light, and 25 schools both kinds. One school reports no shades. Double shades are, of course, often a convenience, especially when the room is exposed to a great deal of sunlight or when a lantern is sometimes used in it in the day time. But for ordinary rooms

the *light* shades are quite sufficient.

60 % of the schools use dark shades

The Attachment of Shades to Windows

This is also an important matter. 256 of these schools report the shades fastened at the top. This is the worst of all possible arrangements for the school-room. The top of the window needs especially to be kept open to strong light that the farther side of the room may be well illuminated. There is little likelihood of the sunlight which enters from the top of the windows falling on the pupils. The pupils sitting close to the windows are most apt to suffer in this respect and in the average school room in order to save them from the glare there is nothing to do but pull a dark shade down almost to the bottom of the window, thus cutting off all the valuable diffusion of light from the upper walls and ceiling for the sake of shutting off the undesirable glare of sunlight through the lower sash.

It should be obvious that light is more important than "looks" in the school room, but "looks" do not have to be ignored altogether. If only one shade can be attached to each window it should either be adjustable or fastened at the bottom of the casing. Two shades, one at the bottom of the casing, and one in the middle are a fair substitute for the adjustable shade. Only 8 of our schools report adjustable shades; 7 report them fastened at the bottom of the casings, 31 in the middle; while 256 schools adhere to the objectionable top attachment.

80 % of the schools have shades attached at top of window casings

If all our schools were equipped with artificial lights the problem of illumination in dark winter afternoons would not be so serious. Only 175 of the schools report artificial lighting. Electric lights are used by 134 of these schools, gas by 31, and oil lamps by 6.

The Blackboards


The main blackboards should obviously be in front of the pupils. This is the case in 838 rooms as reported; they are at the side in 289 rooms; behind the pupils in 2 rooms. In regard to height, they are reported to be low enough for pupils of various ages in 295 schools; too high in five schools, and of proper height for all but the primary grades in 6 other schools.

No inquiry was made as to the surfacing of the blackboards. This, as is well known, is not always what it should be, namely a dead black or dark green slate surface.

Floors

The floors of school rooms present serious hygienic problems. The ordinary wooden floors are hard to keep clean. They are often cracked and, if of soft wood and bastard sawed boards, they are often splintery.

The floors of 273 of these schools are reported as hardwood; 52 are softwood; both hard and soft 2; tight floors are claimed by 214 schools. The floors of 74 schools are cracked and of 57 schools splintery.



16 $\frac{1}{2}$ % of the schools have splintery floors

Oiling and Washing

An oil dressing of one kind or another for floors is popular in schools, on the ground that it keeps down the dust both during school hours and during sweeping. It is probably possible to use oil so that it will produce satisfactory results. If put on too frequently or in too large a quantity it is often very objectionable, not merely in making the dust and dirt stick to the floor, but also in adhering to shoes and skirts. Oil is often the refuge of a lazy janitor. On the other hand it may be used so infrequently as to accomplish nothing except preventing the needed scrubbing of the floors. There is certainly no substitute for thorough scrubbing of school-room floors and no floor, grimy with heavy oil, can compare with a tight hard wood floor frequently scrubbed. The use of a sweeping compound is

sufficient to keep down the dust in sweeping such a floor.

The popularity of oil, whether deservedly or not, is attested by the frequency of its use,—127 schools reporting oil on floors. No definite standard as to how often a floor should be oiled, seems to prevail as the following table shows.

Table XII

Floors oiled, how often?

Daily by sweeping compound	3
Weekly-monthly	4
6 weeks-two months	10
3 months	5
4 months	29
Once a year	27
Once every two years	4
Once every three years	2
When needed	3

Washing of Floors

Great diversity as to the frequency of scrubbing schoolroom floors exists, as is shown by the following table.

Table XIII

Floors washed, how often?

Daily	5
Weekly	12
2-3 weeks	19
Monthly	52
6 weeks	5
2-3 months	50
2 times a year	23
Once a year	15
When needed	6
Irregularly	5
Often	2
Dry cleaned when needed	2
Dry cleaned once a year	1

52 % of the schools do not scrub the floors oftener than every two months

Dusting

This should always be done after the dust has well settled, preferably in the morning before school and with an oiled or damp cloth. The feather duster and dry cloth should not be tolerated. Our schools frequently fail to specify the precise method, 146 simply reporting that the dusting is done with a cloth; 48 specifying an oiled cloth or dustless duster; 15 say "with a duster"; 8 frankly confess "a feather duster"; 14 a brush or broom; 5 a damp cloth; 2 use a vacuum cleaner, and one "doesn't know how it is done."

The times of dusting are summarized below:

Table XIV

Mornings	181
Evenings	52
Daily	23
After sweeping	2
No set time	2
Seldom	1
Don't know	1
Saturdays	1
Monthly	1

18% of schools report that dusting is done soon after sweeping

Children Subjected to Dust of Sweeping

This probably occurs oftener than it is admitted. 249 report that they are not; 33 that they are. This is explained by several to occur after hours or when they are kept after school. A few schools were inspected which reported negatively on this point and in all of them the sweeping was begun before the children were out of the building in the evening.

Nearly 12% report that children are subjected to the dust of sweeping

Parents may well demand, either that their children be not detained after school or, if they are, that it be in a portion of the building where there is no sweeping allowed while they are there.

Washing of Windows

We hardly need emphasize the necessity of clean windows, not merely from the point of view admitting light, but also for aesthetic considerations. Table XV gives the current practice as here reported.

Table XV

8 times a year	21
4-5 times a year	34
2-3 times a year	124
Once a year	35
Often	2
When needed	37
Irregularly	3
Seldom	5
Never	2



31% of the schools do not wash windows oftener than once a year

The Care of Pencils, Pens, and Books

These articles present many difficult questions. It is known that diseases may be transmitted through the promiscuous use of any or all of them. This is especially apt to occur in those schools where they are furnished by the school authorities. Pencils are sometimes given out every day and after being handled all day and put in mouths are collected with no effort to keep them separate and returned the next day without regard to the previous users.

Disinfecting

Systematic disinfecting of all such articles as well as of the school rooms themselves has been strongly recommended and practiced in some schools. There is, however, today a feeling

that this is largely wasted effort and that the really important thing to insist upon is greater cleanliness both of rooms and children and the exclusion and treatment of actual disease carriers.

Råpeer states in an unpublished report that soap and water cleaning are recommended by the New York State Board of Health instead of fumigation. "In fact, cleaning and sunlight are gaining rapidly in favor with experts in this field over older methods of disinfection that have been brought in during the past fifty years. Fumigation has been aptly called 'Burning incense to our superstitions.' It may be necessary in some cases merely to allay the fears of parents, but soap and water scrubbing should accompany it."

Our inquiry included the question as to disposition of pens, pencils, and books. The material obtained in answer to these questions was very fragmentary and unsatisfactory. In many cases nothing was given, and where the questions were answered they were often answered ambiguously or without bringing out definitely the information desired. The answers as far as they could be used are given below.

Table XVI

The disposition of pens and pencils, if furnished
how? disinfected?

Not furnished	37
Given to pupils but they keep them	10
Pencils kept in a box and distributed by teacher	12
Primary grades, only, have pencils kept by teachers	9
Kept in block or perforated tray, envelopes, racks, etc.	8
Kept loosely together and passed indiscriminately	7
Kept in boxes and marked with the child's initials	2
Teacher has a certain place for each child's pencil	2
Kept in cases and distributed by pupils in charge	1
Distributed by monitors	1
Some promiscuous use of pencils	1
Distributed each morning by teacher and daily disinfected	1

Table XVII

Are books furnished and disinfected?

Not furnished (most schools left this blank) 22

Disinfected:

Yes 10

No 66

How often?

Three times a year 1

Twice a year 6

Once a year 6

Irregularly 7

After epidemics 8

THE HYGIENE OF THE CHILD

Testing of Eyes

Where it is impossible to have this done by nurses or physicians it is recommended that preliminary testing be done by the regular teachers. Many of the pronounced cases of eye defect can be detected in this way and referred to the specialist.

In answer to the query as to whether the eyes of children are tested at school, 102 schools report that they are; 198 that they are not. In 27 schools besides the above, it is stated that special cases are tested. This testing is said to be done by teachers or superintendents in 29 schools and by a school nurse or physician in 44 others.

In 66% of the schools the children's eyes are not regularly tested

Dental Inspection

Almost as necessary as the testing of the eyes is inspection of and instruction in the care of the teeth. Twelve cities and towns (including Des Moines) report dental inspection and 168 report in the negative.

A

B

(A) 34% report testing of eyes (B) 3.5% report dental inspection

The School Nurse

Effective medical inspection is now recognized to depend largely on the assistance of a school nurse or corps of nurses. They are for all practical purposes as efficient in detecting unhealthful conditions in a school as are the physicians and they can do much that the physician cannot do in following up the inspection and securing proper treatment of those who need it. Regular medical inspection by physicians has made very little headway in Iowa, partly on account of no legislation either mandatory or permissive upon the subject. Several Iowa towns have, however, employed nurses to do this work. Not all such towns are included in this report. Of the towns and cities reporting, three report an all-time school nurse or nurses, and two report having, on occasion, the services of a "visiting nurse," presumably employed for general supervision of health conditions in the town.

Other Agencies or Precautions for Safeguarding the Health of Children at School

The following points were practically all that were mentioned. Most of the reports were entirely blank on this point. It is obvious that the health problem does not claim much attention in these Iowa schools.

One city reports examinations by a physical director who keeps records of children's conditions.

One city reports teachers' special effort to supervise the health of the children. This is supplemented by a part-time school physician.

One city mentions gymnastics as its only special agency.

One reports that children suspected of having contagious diseases, weak eyes, adenoids, etc., are examined by the town health officer. Children not properly clean are sent home to receive attention.

One reports occasional inspection by city health officer.

One reports fumigating on occasion and talks to children on hygiene.

Two mention the work of the physical director.

Two mention the Board of Health.

One says that in case of serious illness a doctor's permit is required on returning to school.

Nine mention disinfecting as the only health measure.

Two towns provide hygiene talks for pupils and parents.

Three report that the teacher watches the health conditions and reports to physician.

Thirteen report simply "the watchfulness of the teachers."

Two report physicians on the School Boards.

One reports health practice at home as a part of the school work in physiology and hygiene.

One reports that the teachers report each day to principals any cases of sickness.

Two mention out-door exercise and pure country air.

One mentions advice of city physician also that a local physician gives lectures on evil effects of narcotics and alcohol.

One says that "the superintendent keeps on the look-out all the time."

One says "health certificate is required after absence."

One reports inspection by the medical society or by a visiting nurse.

One says that cases coming to attention of teacher are recommended to the family physician.

One reports making a health survey according to Dr. Hoag's Outlines.

One says that children not feeling well are sent home and another that teachers report cases of sickness to local Board of Health.

One says that the schools have excellent bath accommodations.

One reports a part time school physician.

One reports sending unhealthful children to an open air school.

One reports free clinics and free dispensary and school doctor.

The following fuller statements from certain principals are of interest in showing how some schools are facing the health problem. Very few statements of this nature were received. We had hoped there would be many. Most of the comments at the ends of the reports were of the brief, fragmentary character reported above.

"Each teacher is instructed to test eyes of children by charts for this purpose. Also watch for children with throat trouble. If the child is thought to have troubles, he is sent to a physician. We have sent several cases to the doctor this year. All were needing treatment. We found four cases of very bad eyes. One so bad that the little girl will probably never go to school again

I am a new man here and the leading doctor is on the board, so we have to handle this phase of the work very carefully. I shall do more in this regard next year." (Dallas Center.)

"I. By the use of a 'Snellen Test Card' we seat our pupils according to acuteness of vision.

II. In every room in our building we have two full size sash screens. These are made of two thicknesses of cheese cloth. *one* screen is in upper half of window, and the *second* one in lower half, but at right angles to the one in upper half.

III. In our First and Second grades we do much of our work out doors or in the 'Fresh Air Room—' (a room with six cheese cloth screens in it.)

IV. Our First Grade has no desks. We have tables with drawers and the 'Sanitary Mosier Chairs.' Both First and Second Grades use this room alternately. It is not a '*Cold Air*' room but a '*Fresh Air*' room— we keep the temperature from 68 degrees to 70 degrees here, also." (Des Moines.)

"We had no medical inspection up to the tenth week of school but at that time we secured a nurse and she is at work. We had a nurse beginning in January, 1914, for the first time." (Keokuk, Nov. 15, 1914.)

Schools maintain 2 periods of gymnasium work, (a director for boys and one for girls) each week, 45 minutes in length, 30 minutes floor work. Two equipped gymnasiums used, one for boys and one for girls. Physical records and measurements made and kept, comparison with normal growth possible. Plans are under way to get free treatments for eye, ear, nose and throat and teeth of needy children.

This building has shower bath equipment. (Charles City. This town also reports the services of a full-time school nurse.)

"We have a fine location for our school house. It is located on one of the highest pieces of ground in the town. It is situated on a hill overlooking the Maple River Valley. There are about 200 elm trees planted on the school grounds. The lawn is well looked after by our janitor. Physical apparatus and swings have been placed at different places on the school grounds. There are also two outside basketball courts, one for the girls and one for the boys." (Castana.)

"Six local physicians attend to our medical inspection free of all cost. They are the best men we have, and they rank high.

Some were interested in discovering the facts. All felt that there was great need of giving school children better attention. Personally I feel that when pupils fall behind their class, attention must first be given to their physical condition. I find that this is true absolutely. And the medical report gives me a powerful weapon when a parent objects to his child's progress.

Just assigned two men to each building. They spent from 9 to 10 a. m. each day till all were examined. Only one parent objected. The examinations brought about numerous operations. Many, however, have not cared for their children yet. But I reported to each teacher the pupils in her room needing attention, and as opportunity comes, she sees the parent and urges the matter.

I am convinced that it is a move in the right direction. We may call some meetings a little later and invite the parents whose children need the most attention." (Cherokee.)

Below are reproduced the medical inspections blanks used in Cherokee.

INDEPENDENT SCHOOL DISTRICT OF CHEROKEE, IOWA

MEDICAL INSPECTION OF SCHOOLS

NOTICE TO PARENTS

Mr.

Dear Sir:—This is to notify you that
....., a pupil in the
..... School is in need of
medical attention for,
you are advised to consult a physician without delay.

Yours very truly,

Date

..... Supt. of Schools

INDEPENDENT SCHOOL DISTRICT OF CHEROKEE, IOWA

MEDICAL INSPECTION OF SCHOOLS

Name, Address..... Age.....

Parent or Guardian

Vision, Right eye

Vision, Left eye

Hearing, Right ear, Left ear,.....

Nose

Throat

Tonsils, Right Left,

Adenoids

Teeth

General condition, skin, etc.

Notice sent,

Remarks

Inspector M. D.

The Extension Division has issued the following pamphlets, copies of which may be obtained, free of charge, upon application. Similar papers, along the same and other lines, will be published from time to time, as material is available.

	Serial No. and Date
<i>Preliminary announcement</i>	70 Dec. 1, 1913
No. 1. <i>Street lighting</i> , by Professor ARTHUR H. FORD	75 Apr. 25, 1914
No. 2. <i>Rate making for public utilities</i> , by Dean WILLIAM G. RAYMOND	76 May 2, 1914
No. 3. <i>Engineering as a profession</i> , by Dean WILLIAM G. RAYMOND	73 Apr. 11, 1914
No. 4. <i>Store lighting</i> , by Professor ARTHUR H. FORD	80 May 30, 1914
No. 5. <i>Economy of time in arithmetic</i> , by Professor WALTER A. JESSUP	82 June 13, 1914
No. 6. <i>Vocational guidance in high school</i> , by Associate Professor ERVIN E. LEWIS	85 July 4, 1914
No. 7. <i>Ninth annual announcement of the Iowa High School Debating League</i> , by Assistant Professor GLENN N. MERRY	86 Oct., 1914
No. 8. <i>Water works statistics of thirty-eight cities of Iowa, with the meter rates of seventy cities</i> , by Assistant Professor JOHN H. DUNLAP	87 Nov., 1914
No. 9. <i>Work, wages, and schooling of eight hundred Iowa boys in relation to the problems of vocational guidance</i> , by Associate Professor ERVIN E. LEWIS	90 Feb. 1, 1915
No. 10. <i>Principles of advertising</i> , by PHILIP J. SODERGREN	98 May 22, 1915
No. 11. <i>Hygienic conditions in Iowa schools</i> , by Assistant Professor IRVING KING	99 May 29, 1915

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